PROJECT PARTNERS

AUSTRIA

CEST competence center

FRANCE

Lyon 1

GREECE

University of Ioannina

skaloma s.a. fishfarming

ITALY

AEIFORIA

The BioRobotics Institute – Scuola Superiore Sant'Anna

ISTITUTO DELTA ECOLOGIA APPLICATA

NORWAY

NIVA Norsk institutt for vannforskning

SCALPRO

PORTUGAL

ipma instituto português do mar e da atmosfera

ROMANIA

INTRAROM

SPAIN

idaea Institute of Environmental Assessment and Water Research

iQAC Institute de Química Avanzada de Cataluña

ICMAB Institut de Ciència de Materials de Barcelona

Universitat de Barcelona

ICRA Institut Català de Recerca de l'Aigua

SWEDEN

CapSenze

UNITED KINGDOM

University of Plymouth

CONTACT INFORMATION

www.sea-on-a-chip.eu

Project Scientific Coordinators

Prof. Damià Barceló
dbcqam@cid.csic.es

Dr. Marinella Farré (Deputy)
mfuqam@cid.csic.es

CSIC
Spanish Council of Scientific Research

Project Manager
Dr. Marianne Köck
mkoqam@cid.csic.es

IDAEA-CSIC
Carrer Jordi Girona 18-26
08034 – Barcelona, Spain
Phone: +34 934006100

SEA-on-a-CHIP

Real time monitoring of **SEA contaminants** by an autonomous **Lab-on-a-Chip biosensor**

(2013 – 2017)

Food, Agriculture and Fisheries, and Biotechnology Knowledge Based Bio Economy (KBEE) OCEAN 2013.1

"SEA-on-a-CHIP has received funding from the European Union's Seventh Programme for research, technological development and demonstration under grant agreement No 614168".

Challenges

Chemical contamination of estuarine-coastal waters is affecting water quality, with negative implications for the environment, human health, and fisheries and aquaculture facilities.

In response to the increasing concern on biological and chemical degradation of water, the EU has focused on technology development and innovation for rapid assessment and monitoring of contaminants.

These complex challenges require technological solutions that can only be developed with the contribution of high level experts and research facilities. In this context the SEA-on-a-CHIP project will promote the development of a miniaturized, autonomous, remote and flexible immuno-sensor platform based on a fully integrated array of micro/nano-electrodes and a microfluidic system in a lab-on-a-chip configuration with electrochemical detection. This platform will allow real time analysis of marine waters in multi-stressor conditions.

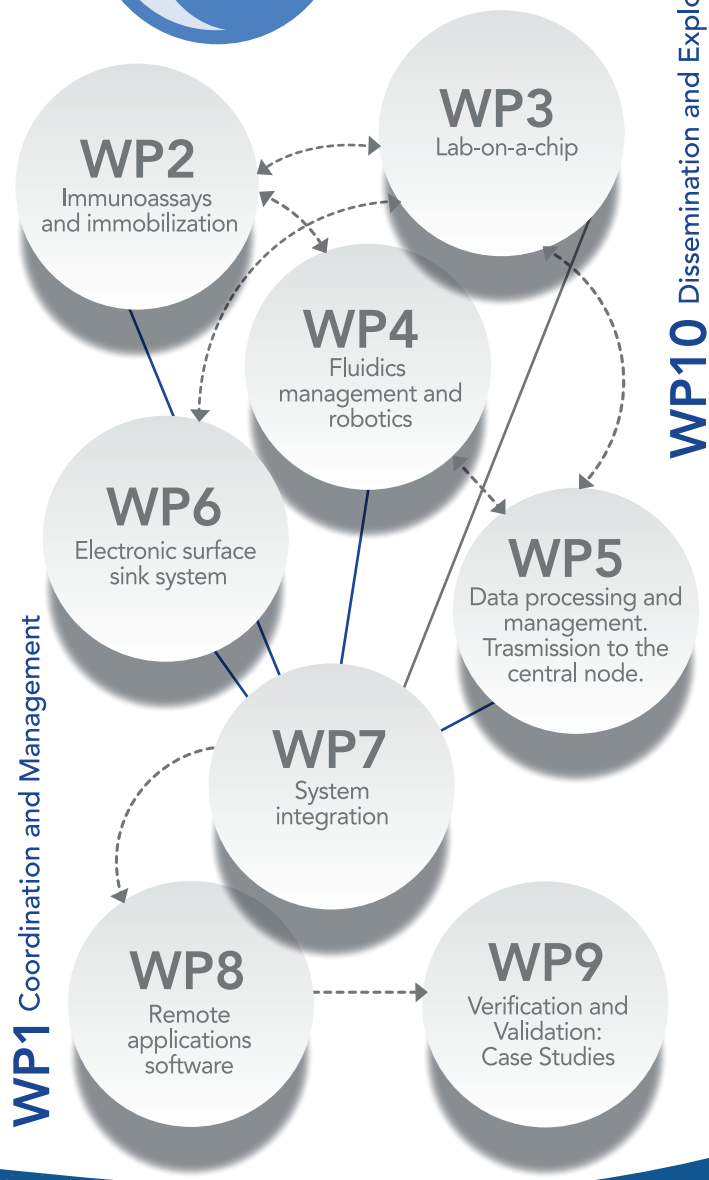
Methodology

The platform will be able to perform 8 simultaneous measures in duplicate and it will be built in order to work with one-month autonomy and to measure in real time at least once per hour. As many devices as needed could be connected simultaneously to the same platform resulting in a very flexible and cost-effective system. The units will be tested throughout the lifetime of the project and calibrated to state-of-the-art of chemical analytics: first in laboratory studies, second under simulated real conditions and finally in 3 field experiments set up in 2 aquaculture SME facilities.

Multidisciplinary approach

SEA-on-a-CHIP unifies 17 partners with outstanding expertise in different fields of research, such as analytical chemistry, environmental science, biochemistry, immunochemistry, nanotechnology, robotics and microelectronics wireless sensors. The consortium is composed of universities, research institutes, 6 SMEs and one industrial partner.

Project Workflow



Objectives

- **Develop and validate** the real time immuno-sensor platform for the assessment of chemical contamination in estuarine-coastal waters
- **Improve technology** associated to multianalyte immuno-sensor for early warning environmental monitoring
- **Test the prototype** in aquaculture facilities, via the rapid assessment of 8 selected contaminants from groups of compounds that affect aquaculture production (compounds which are toxic, bioaccumulative, endocrine disruptors), but also affect environment and human health (antibiotics and pesticides)
- **Adapt the prototype to other target compounds** or other situations for coastal water contamination analysis
- **Identify, monitor and assess** anticipated risk related to marine pollutants for fisheries and aquaculture facilities
- **Provide real time monitoring and a cost-effective tool** for chemical contamination to risk managers
- **Transfer of knowledge** through different activities, such as workshops and a summer school, with a view to commercializing the device